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OFFICIAL PROCEEDINGS

Meeting of April, 1920

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AND

PAPER and DISCUSSION

ON

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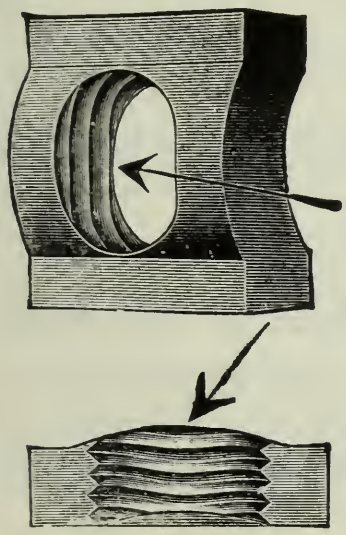

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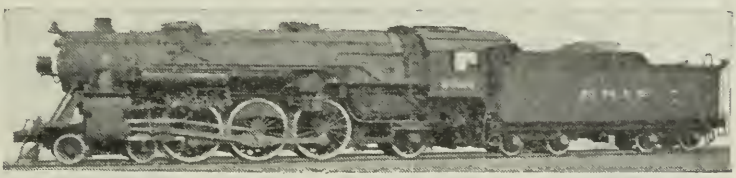

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PROCEEDINGS OF THE CANADIAN RAILWAY CLUB.

Windsor Hotel,
Montreal, April 13th, 1920.

Chairman:

Come to order please. The first order of business is to sign the cards which you will find in the seats. The minutes of the previous meeting have been issued and are being mailed you. I have not any remarks to make just now but will ask the Secretary to read the list of applications for membership.

Secretary:

Mr. Chairman, and members, the list is gradually diminishing owing to our having reached the last meeting of the year, but I think you will agree that we have had a pretty successful year in so far as new members are concerned. I take pleasure, however, in reading the following applications for membership, all of which have been passed upon by your Executive and are now submitted for ratifications:

New Members.

G. Cavin, Mech. Engineer, Canadian Locomotive Co., Kingston, Ont.

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Mr. E. A. Cunningham:
I move that these names be accepted.

Mr. R. Crawford:
Seconded.

Chairman:

It has been moved by Mr. Cunningham, seconded by Mr. Crawford, that these applications be accepted. Are all in favor? Carried.

Secretary:—

Our president has allowed me to make a few remarks in regard to membership. I have endeavored to collect all the membership dues, and do not think I have failed in this as in looking over the membership list it shows a fairly clean slate, but there are still a few delinquents, and I have written them, and expect at the next meeting to report a flourishing state of affairs in so far as membership remittances are concerned.

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Bermingham, T. C.
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Dohm, J. T.
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Spidy, E. T.
Taylor, S. P.
Thomas, E.
Thorburn, C. D.
Wickson, F. R.
Woodbridge, H. C.
Young, C. E.
Booth, W. A.
and others.

Secretary:

Under the heading of new business your president has asked me to announce that at the meeting of the Executive

Committee to-night the following gentlemen were electd as a Nominating Committee to prepare a list of officers for the next season. Their names are as follows: Messrs. G. M. Wilson, Arthur Allan, J. A. Shaw, W. A. Kingsland and G. W. Robb.

At the meeting to be held next month, at which reports are to be received and the election of officers takes place, there will be the usual entertainment and smoking concert, and a committee has been appointed to take care of the arrangements for same, composed of the following gentlemen: Messrs. Norman Holland, Wallace H. Robb, E. D. Smith, and the Secretary. We intend to provide you with something good at the May meeting. It has always been an interesting function and we will try to maintain the standard.

Chairman:—

The next order of business is the reading of the paper of the evening by Mr. H. R. Naylor, Asst. Works Manager, Car Dept., Canadian Pacific Railway, Angus Shops, Montreal, on "Freight Car Roofs." Will Mr. Naylor kindly come forward?

Paper.

Car roofs or the upper covering of what are classed as house cars are a most interesting study. In point of importance they may be considered almost as essential as the wheels of a car, for although the wheels are the principal factor in moving a car from one location to another, the roof provides the necessary protection for the merchandise, which otherwise would be damaged or totally destroyed.

The essential features of a car roof are to act as a watershed, enclosing the car, thereby providing security for the contents, and also to effectively tie and brace the car superstructure.

A car roof consists of a suitable framing securely attached to the top of the side and end framing of the car, providing the necessary support for the roof boards, metal sheets, or other materials which form the outer covering.

In Europe, where the roof type of car has not been adopted to the same extent as in America, large quantities of freight is transported in open top cars, over which tarpaulins are spread and fastened to protect the lading from

the weather. This system, however, is gradually being abandoned as new equipment is built, and the house class of car adopted.

It is interesting to note the progress made on this continent in car roof construction from the time when the outer covering consisted only of a single layer of boards having tongue and grooved joints. In many instances, I believe it was customary to use a wood shingle roof similar to that commonly used in house construction. Another method adopted, presumably to overcome the leakage, was to apply the roof boards lengthwise of the car, overlapping each other similar to clapboarding on present day wooden buildings, but it can be readily understood that this method of construction proved unsatisfactory, and gave way to the double board roof which can be seen on a large number of cars even to-day. This was a decided improvement over the earlier types of roof, especially when at a later date a layer of waterproof paper was applied between the first and second course of boards, and became known as the "plastic roof." This roof undoubtedly protected the lading for some time, but it eventually became waterlogged, and a method was then sought to prevent the water leaking between the joints of the top course of boards which rapidly destroyed the paper and bottom boards. This was overcome to a great extent by grooving the face of the top boards, the grooves acting as drains, carrying off the water, and protecting the joints from possible leakage. In fact, this is the most common type of roof to be found on stock and refrigerator cars at the present time.

The plastic roof, however, proved unsatisfactory for box cars, as the top course of boards soon warped, shrunk, and split, due to the constant drenching and sun-baking received, allowing the under-courses of paper and boards to become waterlogged, setting up rapid decay and ending in numerous damage claims.

So far it should be noted that only wood, paper, and in some instances canvas, were being used in roof construction, which in themselves are very poor weather-resisters, creating a demand for further improvements, which brought metal into use for the first time. The next step was a distinctly new departure, and brought into existence the metal sub-roof, over which a wood roof was applied for protection only. The roof framing consisted of a ridgepole, carlines and purlins, to which an addition was made in the form of cross rafters. The galvanized metal sheets were formed

with corrugations, and fitted into suitable grooves in the ridgepole and rafters, providing altogether a fairly effective watershed.

This was undoubtedly a distinct advance in roof design, and was the forerunner of the sub-metal roof on thousands of box cars at the present time, but it was not long before the usual complaints were being made about this new metal roof, owing to the grooved edges of the wooden rafters breaking away allowing the metal sheets to sag and leak. This defect was eventually overcome by flanging the roof sheets, and applying a metal capping over the rafters, which enclosed the flanges of the roof sheets, making a continuous metal watershed for the full length of the car. With a few later modifications this was the final attempt along the lines of a metal sub-roof.

Some of the principal objections to the metal sub-roof are that the roof sheets in time buckle up at the eaves, and work out of the grooves in the ridgepole. With the constant twisting and straining of the car superstructure, the metal sheets and caps are soon displaced and bent, and in making repairs to the outer wood roof the metal sheets are frequently punctured by nails carelessly driven, all of which result in damage to the lading. The outer wood roof also requires frequent renewal, on account of constant exposure, which is a rather expensive item when added to the cost of maintaining the metal sub-roof.

Before passing to the consideration of more modern roofs, it should be observed that the metal sub-roof proved a distinct advance over the types previously used, and was with few exceptions the standard design on box cars for upwards of twenty years, but the steady increase in car capacity and length of train threw an ever-increasing load on the car superstructure, including the roof framing, this demanding in turn improved roof construction. This demand was met by adopting a roof framing made of steel, as in other parts of the car, for instance, the wooden carlines which were bolted to the sideplates, and a source of constant trouble, gave way to the steel carlines of various shapes, rivetted to the sideplates, in order to give greater rigidity and strength. Other parts of the roof framing were improved and reinforced in a similar manner, providing greater stability, which is most essential if the outer roof is to be protected from the racking and straining of the car superstructure. This demand for greater stability was largely responsible for an entirely new departure in

roof design, for instead of placing the wood roofboards on the outside, as in the case of the metal sub-roof, the plan was reversed, the roof boards being applied direct to the roof framing, and the metal roof sheets used as an outer protection for the boards in addition to acting as a watershed. The roof boards in this case being applied direct to the roof framing had the effect of bracing the roof against cornering and bulging, and brought into extensive use the outside metal roof.

The outside metal roof usually consists of one course of 13/16″ tongue and grooved boards, securely fastened to the roof framing, the outer metal roof being formed of galvanized iron sheets generally of No 22 gauge. At the junctions of the main sheets suitable weather-proof protection is provided by metal caps, formed in various ways to interlock with the flanged edges of the main sheets. The method of securing the outside metal sheets at the eaves is very different to that on the metal sub-roof. The roof sheets on the latter type are prevented from lifting by the capping and outer wood roof, the fascia boards securing the sheets laterally on the car, making nailing unnecessary at the eaves. On the outside metal roof the main roof sheets or eave flashings are flanged at the eaves and secured to the outside of the fascia boards. This difference in the method of attachment on the early types of outside metal roofs, which were not designed to allow freedom of movement at the roof sheet intersections, resulted in cracked sheets and a considerable number of defective roofs, but eventually this was entirely overcome by providing ample sideplay at the main sheet capping, and applying eave flashings, giving the roof the necessary flexibility to withstand the cornering, weaving and bulging of the superstructure.

It will be noted in the development of roof construction that wood is being gradually eliminated, or restricted in its use, for instance, the wood framing is being abandoned in favor of steel, and as a roofing it is used only to protect or support the metal roof sheets, all of which is in keeping with the steady advance in car construction.

Progressing still further along these lines we find roofs to-day built entirely of steel, and in consequence are known as "all-steel roofs" In comparison with the composite roofs already described, the all-steel roof presents an entirely new departure in design, both in regard to framing and roofing. The roof sheets are usually of 1/16″ galvanized steel, but in some instances the sheets are 3/32″ thick and span the full

width of the car, providing in themselves the necessary protection against puncture or other hard usage. Additional reinforcement can be obtained by corrugating the roof sheets at suitable intervals. The carlines in most cases are designed to provide ready means of connecting the roof sheets, in addition to supporting the roof, and bracing the superstructure of the car.

With the adoption of the all-steel roof, the question of flexibility becomes a very live subject, some types provide for free movement of the roof sheets, in a similar manner to the flexible outside metal roof, while in others the roof sheets are flanged, capped and rivetted together, forming in themselves an absolutely rigid roof. It is claimed for the first type that the roof should be sufficiently flexible to take care of the constant straining of the car body, while in the rigid type the roof is made strong enough to resist the straining of the body, and act as bracing for the superstructure.

The all-steel roof lends itself readily to the use of outside carlines, this arrangement giving the car a considerable advantage in loading space. Other advantages being the reduction in fire risk, and final cost, owing to the life of the roof more nearly corresponding with other parts of the car and finally a greater safeguard against leakage is obtained by the use of thicker sheets, which resist corrosion and cracking to a greater extent, and as a result this type of roof is gradually meeting with more general approval.

An objection which is sometimes raised against the All-Steel roof is the claim that under certain conditions it is liable to sweat, resulting possibly in damage to lading. For instance, freshly milled flour containing a high percentage of moisture, and which is usually hot when loaded, quickly raises the temperature of the car above that of the outside atmosphere. It is claimed that the metal roof being then subject to two widely varying temperatures commences to sweat, and that the resultant moisture is sufficient to damage the contents. It is questionable, however, if this is of enough importance to warrant special attention when building box cars for general service requirements, but as a measure of precaution effective steps are being taken to prevent the possibility of this occurring even under the most extreme conditions, and eventually there is good reason to believe that the All-Steel roof will meet all requirements even to the extent of satisfying the demands of very exacting shippers.

As previously mentioned, the double board roof is the most common type on refrigerator and stock cars to-day, and while it meets the requirements for stock cars, it is rather surprising that a better roof has not been previously adopted for refrigerator cars in order to protect more effectively the insulation. In making repairs to this class of car it is often necessary to renew the whole roof insulation, and ceiling, which have become waterlogged and decayed, owing to the poor protection offered by the double board roof. The entire side and end framing with their insulation are often affected in a similar manner, due to the water working down through the defective roof. These conditions are becoming better recognized, and as a result we find the outside metal roof now being adopted for refrigerator cars. Owing to the metal roof being a greater conductor of heat it might be necessary to increase the roof insulation, but the added cost would be more than offset by the saving in maintenance.

Having briefly sketched the development of the car roof from the old time shingle to the modern metal type, it might be well to summarize a few of the more essential features entering into roof design, and conclude with a reference to maintenance.

In comparison with the roof of a stationary building, which outside of providing the necessary shelter, has only to contend with wind pressures, the car roof has to withstand considerable more abuse, due to the fact that the car is constantly in motion from the day it is built to the last day of its existence. Consider for a moment what happens to a car, especially a loaded car, when in a switching movement it is shot at a speed varying anywhere up to ten miles per hour, on to a train of cars at rest. Many of us have seen this happen frequently, and still more have heard the report and marvelled that the cars withstood the racket. The underframe of the car in motion is immediately arrested on impact with the other car; but the car superstructure with its contents is not arrested so quickly, with the result that it is strained from end to end, including the roof, which ties the side and end framing together. The car roof must also take care of a bulging load when grain or other material is carried in bulk, uneven track, curving, side wiping, and hump yard switching, all of which set up different strains, which must be considered and provided for in car roof construction in order to keep clear of future trouble.

It is these conditions that persuade many car builders to adopt a roof sufficiently flexible to accommodate the strains in order to ensure it being water-tight. On the other hand, the advocates of the rigid roof believe in making the roof sufficiently strong to withstand the strain, and tie the superstructure together.

In conclusion, I might point to the importance of roof maintenance. A car roof should be so constructed that repairs can be made quickly and at a minimum cost. The position of the roof in relation to other parts of the car does not lend itself to proper maintenance. Trucks, air-brakes and draft gear are constantly being inspected for indications of possible failure, but unfortunately, and all too often, the only warning received of roof failure is when the damage has actually occurred to the lading. Car roofs should therefore, be as far as possible self maintaining.

Corrosion will be an important factor in modern roof maintenance and calls for a systematic method of painting, for it cannot be expected that the galvanizing will protect the roof sheets indefinitely. The best designed car roof will only last in proportion to the maintenance it receives, and the object should be to make the life of the roof equal to the life of the car.

Chairman:

Gentlemen, we have listened to a very able paper from Mr. Naylor, on "Freight Car Roofs." and it should provoke considerable discussion, as there are many points to be looked into, and this should give an opportunity to our car men to present suggestions on the construction of car roofs.

Mr. L. Brown:

Mr. President and gentlemen, Mr. Naylor's paper comes at a good time as we have just had about twenty-four hours of rain. I took the opportunity this morning to examine a number of cars standing alongside of an unloading platform. They were general purpose cars or cars used for general freight. I went into many cars a number of which had leaky roofs. It shows the great need of better attention to car roofs. I therefore think Mr. Naylor's paper is very opportune at this time. Each year the average car goes on the repair track five time during the year, and yet this is the condition the cars are in. When a car is built the roofs are generally in good condition and very few are found leaking. The trouble is not in the new roofs but in the old roofs that have been

in service for some time, very few of which do not leak. In looking over the defects in these cars we see that the boards are split, nails get loose and rust away and allow the water to get in through the nail-holes; metal sheets when unsecured, get loose, distorted and punctured. Caps over the inside metal roofs frequently become loose and the water follows the nail holes to the inside of the car. Nails securing the parts on the outside metal sheets work up out of the side plates and through metal sheets; parts securing the outside metal sheets frequently allow the water to get around the sheets which wear away by friction and become cracked over the side plates. The all-steel roof has less objectionable features than the other types and the condensation of moisture has been overrated in proportion to its importance, and the shipments which are damaged by moisture are few compared with the damage caused by water leaking in from the outside. The condensation inside may be eliminated by proper ventilation or by the use of non-conductive materials on the inside. This can easily be done by the car owner, and as these roofs become more numerous the shippers will become aware of what is necessary to protect themselves against these conditions. Regarding the difference of opinion as to whether the flexible or rigid roof is the better; I think the rigid roof is preferable as it holds the car together much better, and I agree with Mr. Naylor that a roof under ordinary conditions should last the life of the car. Objection has been raised to the rigid roof on account of causing derailments, but there is little justification for that theory. I have made tests of various roofs on empty cars and loaded cars with various types of roofs, and find that the additional force necessary to twist the cars having rigid roofs is negligible. The rigid roofs are not blamed for derailments of passenger cars which have such roofs and travel faster, have greater side bearing movement and have permanently heavier loads. It is necessary that the car roof should be simple in construction so that the members can be easily assembled and replaced when necessary. The parts of car roofs should all be of good quality and of ordinary commercial materials when possible this latter qualification being very essential for roofs requiring frequent repairs, but for roofs designed to last the life of the cars special material may be preferable. Cheapness in original cost has in the past been too large a factor in determining the kind of roof put on cars: a few dollars saved on a car in this way means loss of money later on, and $20.00 extra put into a car roof to make

it reliable will prove one of the best investments that railways or car builders can make.

Mr. E. V. Harrison:

Mr. Chairman and gentlemen, we have been very much interested in hearing what Mr. Naylor has said in regard to car roofs and the progress that has been made within the past few years in their design and construction. He speaks of the car roof as being necessary not only to protect merchandise but also for the purpose of holding the car together. I would like to touch on the point of protection of the merchandise. I find, from an operating standpoint that it is not so much the damage to merchandise from the roofs as from the side sheeting. During the past few years in the case of new cars turned out we have not had any side sheeting with the result that considerable damage has occurred not only to flour but to other merchandise as well. I do not want to give any secrets away to the industrial people but this is a thing which we have had to contend with both in regard to claims and damage.

Mr. James Coleman:

Mr. Chairman, I did not expect to be called upon to speak on this subject. I think there is very little that Mr. Naylor has not covered in his paper. He has reviewed the construction of the car roof from its inception and has also shown the progress made up to the present time. I believe there are more loss and damage claims as a result of leaky car roofs than from any other direct cause, and think the time is coming when the all-steel car roof will be adopted universally for the reason that it prolongs the life of the car, and if well constructed and properly applied will last almost the life of the car. The question has been raised as to the sweating of the steel roof in cars loaded with flour, but I think investigation will show that responsibility for this rests principally with the people who load the flour and fail to take precautions to prevent claims for damage. In October 1919, a circular was issued by the United States Railroad Administration to fifteen railroads at St. Paul and Minneapolis, where an embargo had been issued against the loading of flour in cars with all-steel roofs. I will read the paragraph in this circular relating to this feature which will show the attitude of the Administration:

PARAGRAPH FROM CIRCULAR.

Upon further investigation it has developed that where flour is loaded in a warm condition in any kind of a car, whether *all steel or all wood roof,* if the temperature of the weather is very low, there will be condensation of moisture due to the fact that there is no ventilation in the car and consequently it will cause this sweating.

The Western Weighing and Inspection Bureau has issued instructions on this subject, which read as follows:—

"In the interest of claim prevention, we should endeavor to prevail upon the flour mill people not to load their flour in a warm condition into cars during extremely cold weather; but, if they do so load it, then the flour should be covered with paper in order to protect same against the drippings from the sides or roofs of the cars."

You will see that practically the only people who had objections to the all-steel roofs have withdrawn their objections and have accepted the all-steel roof. There are a number of different types of all-steel roofs in the country and the design is constantly changing, but the time will soon be here when this class of roof will be universally adopted. I believe this subject is receiving more consideration at the present time in Canada than ever before.

Also, there are more All Steel Roofs now being applied to box cars to-day in Canada than ever before.

The only objection that has ever been made to the All Steel Roof was the possibility of sweating. This sweating only takes place when the lading in the car is loaded with the temperature warmer than the temperature of the atmosphere.

There is no possibility of the sweating when the lading is loaded cool or the temperature equalized with the temperature of the atmosphere.

Some All Steel Roofs are constructed with a means provided for ventilation at the eaves, and with this means, any moisture deposited on the underside of the roof sheets will be evaporatel by this circulation. This possibly would not provide circulation enough with hot flour in the car, from 60 to 80 degrees, but this means of circulation will provide for any moisture that may be deposited on the roof sheets under ordinary lading. In confirmation of this, I have never yet heard of a report of sweating of roof except of reports made by the people of Minneapolis and St. Paul in loading flour.

With the years of experience that these people have had at Minneapolis and St. Paul, they now admit that moisture will be deposited on roof of any kind when the flour in the car is loaded at a high temperature, and they have given instructions that some covering—paper or tarpaulin—must be put over lading when loaded at a high temperature, in order to prevent the moisture dripping from the roof; either from a Wooden or All Steel Roof.

Mr. W. J. Hyman:

I wish to congratulate Mr. Naylor on his paper. It is very well put together and covers very thoroughly the developments of freight car roof construction from the oldest type of roof which we can remember right up to the present time.

If you want to start something when there are a few car men around, just mention Freight Car Roofs or Draft Gears and you are sure to start an argument which will last for hours.

Now there is a lot to be said, both pro and con, on this question of roofs, but I believe the point has now been reached whether we should continue to use an inside metal roof or an outside metal all-steel roof, and whether it should be flexible or constructed of heavy enough metal to tie the upper framing of the car together and form a box strong enough to resist any shocks or weaving of the car to which it might be subjected. Both the inside metal and outside flexible metal roofs have been thoroughly tried out in this country, but I do not think the outside solid metal roof which is now being advocated has been up to the present time.

When two cars come together in switching the shock has to be absorbed or dissipated, and although the Draft Gears take care of a great part of this, yet some is transferred into the body of the car, and in the last analysis, the roof, which is the farthest point from the centre of the shock will have to take care of a certain portion.

Taking this into consideration, also the weaving of the car I should like to ask Mr. Naylor which he considers the best, the flexible outside all-steel or the solid outside metal roof for the type of freight equipment which is now being built.

Mr. H. R. Naylor:

I think we are getting to the time when the modern car roof will take the form of an all-plate roof. For some time

it has been more or less of a thin plate roof, but I think in the development of the all-steel roof, the tendency will be to use sheets of heavier gauge, say 1/8" thick or heavier, thus making a god solid plate roof. When this is done the roof will more nearly last the life of the car, whereas to-day the average roof has to be renewed two or three times in the same period. By adopting a roof of this type, there should also be a tendency to avoid designs which are in any way complicated in order to reduce to the minimum the possibility of leakage, and enable them to be easily maintained. The roof therefore, should be designed with the least possible number of sheet joints, the joints being formed and secured in such a manner as to make them absolutely weather proof. Providing the roof sheets are protected from the straining of the roof frame, there would appear to be no necessity of providing for flexibility. The superstructure should be well braced to protect the roof framing, and the roof framing should also be braced diagonally to protect the roof sheets from undue racking and strain.

I say take care of the strains set up in the superstructure and transferred to the roof framing, then we should be able to use an all-steel roof of simple design, which need not necessarily be flexible,

Mr. James Coleman:

I am not wedded to any particular construction of all-steel roof, nor do I wish to advocate any particular construction, but every person who has spoken here to-night seems to be in favor of the all-steel roof, and irrespective of its design or construction I believe it is the proper thing to use, as it should be our aim to put on a roof that will last practically the life of the car.

You will then be saving your company a great deal of money which is now being paid out for loss and damage claims as a result of leaky roofs. Unless the car roof is a good one these claims are exceedingly difficult to avoid.

We should advocate the all-steel roof but not any particular construction, and let the people who are making this class of roof compete with one another in an effort to supply all-steel roofs of different designs. This will encourage a spirit of competition that should exist not only in the case of car roofs but in everything of this character that railways have to buy, as it will serve to improve present conditions, and we can only attain this end by encouraging competition.

The Secreary:

I notice we have with us to-night Mr. Powell. If there is any man who knows more about freight car roofs than Mr. Powell I am badly mistaken. He lives across the river where there are about twenty-five miles of freight cars in the sidings, and as he no doubt takes a walk on Sunday morning, I was wondering if he had noticed any of the car roofs or could give us something interesting on this subject.

Mr. James Powell:

Mr. President, if our worthy Secretary thinks that I take 25-mile walks on Sunday mornings to inspect freight cars he is entirely mistaken. Laughter. I have not yet heard anything said in the discussion about shingling car roofs, although we have lots of houses and other buildings that are shingled and others have galvanized iron roofs. After hearing the paper I think I would be more in favor of the flexible car roof than the heavy roof as the former would take up shocks better.

Mr. J. Burns:

My education has been somewhat limited with regard to car roofs. I agree with Mr. Coleman in regard to the all-steel roof, as the all-steel roof has got to come, and the feature mentioned in regard to sweating of the interior will no doubt be eliminated. There is a question as to the amount of damage that has occurred from the all-steel roof. Several of these all-steel roofs are now in operation on our road, but I have not heard if any damage has occurred. No doubt some of our members here will be able to tell us, and we should also hear from some of the men who pay the claims and who know what damage has been done. In regard to the all-steel roof; I have seen several cars that are equipped, and they all have the solid steel roof riveted together similar to the locomotive cab. The body of the car is in proportion to the roof and takes care of the shocks. In the flexible roof, leakage is no doubt caused by the shocks, and I think when we get the all-steel roof built in proportion to the car we shall not have any more leakage.

Mr. L. Brown:

I should like to add, with referenec to this flexible all steel roof, that I have seen the roof sheets crack on the inside plates of cars built only two years.

Mr. W. J. Hyman:

There is one point I have not heard discussed to-night, and that is the painting of the roof.

A few years ago I examined a great many Outside Metal Roofs that had been in service from four to six years, and on some of these roofs the paint was scaling off, on others along the edges of the carlines the weaving of the car had caused the paint to rub off and naturally they had started to rust.

If some of our paint manufacturers could supply a paint which would stay on without scaling under extreme weather conditions and be elastic enough to take care of the weavings of the car it would go a long way in prolonging the life of the outside metal roof.

Mr. E. A. Cunningham:

Mr. President and gentlemen, with such an array of talent in freight car construction as is assembled here I have some hesitation in expressing myself on this subject. I notice Mr. Pyne in front. Why should he not take part? There are also the paint manufacturers to hear from as to a better covering for the steel. I want to congratulate the speaker, Mr. Naylor. It was a pleasure to see him stand before this club and talk about freight car roofs and I hope he will be encouraged to talk on every subject with which he is familiar. I have much pleasure in proposing a very hearty vote of thanks to him and to the other speakers who have taken part in the meeting.

Mr. Norman Holland:

I second that vote of thanks, but I do not want to debar anyone from further discussion. Mr. Hyman spoke of the arguments as being "pro" and "con." Most of them have been "pro" and we have heard very little "con." This question of being able to make a paint which will stay on roofs is extremely simple. You can make anything if the consumer will pay the price. It is possible to make a roof composition that will stay on cars. The sample I have here consists of sixteen coats of such a paint. You can see how elastic it is. It is made for passenger car roofs. It would be too expensive to make it standard for freight cars, although it might not be too expensive if you figured it out from the standpoint of maintenance cost. The point is that in dealing with freight car roofs you have

to consider the joint in your board, and you cannot expect anything to be elastic enough to stand one half inch warping, and I have seen warps that were one and three quarter inches.

An Irishman who lived in a small house was always complaining about the roof leaking, and his friend said, "Pat, why the devil don't you fix it." Pat replied, "I would, but whin it rains it's too wet to go on the roof, and whin it's dry it don't nade any fixin'."

This seems to be the trouble in fixing freight car roofs. "Laughter." So far as claims are concerned, my own company have been very lucky. Some time ago when this subject was discussed here I had to stand criticism because I said that the average company who made claims were to blame themselves in 99 cases out of a 100. In ten years we have had only one claim and that, when it was sifted down, showed that the railway was not to blame, because the car had been in an accident, and I have never yet found a car roof that could withstand accident. So far as claims for leakage are concerned, we have been very fortunate.

I am sure we have all enjoyed this paper. It is a paper which brings out a good discussion. It was extremely clear and I have appreciated it very much. This is the last paper of the year, and I am sure you will all agree with me that the season has been fittingly closed with a most excellent paper.

Chairman:

Before puting this motion to the meeting I should like to know if Mr. Pyne has anything to say on this subject.

Mr. R. A. Pyne:

Evidently there are some members who like to hear Mr. Pyne talk. I do not know that I can say anything. This is essentially a Car Dept. question, and I, with others, wish to congratulate Mr. Naylor in his description of car roofs. I cannot add anything to the discussion. Mr. Coleman here has fully expressed my views, and am bound to confess that possibly I have not been paying as much attention to the bad condition of roofs as I have been paying to my cellar. It is a long way from the cellar to the roof, but if the Executive of the Club can get someone to write a paper on the proper arrangement of a cellar to protect something dry—. I think,

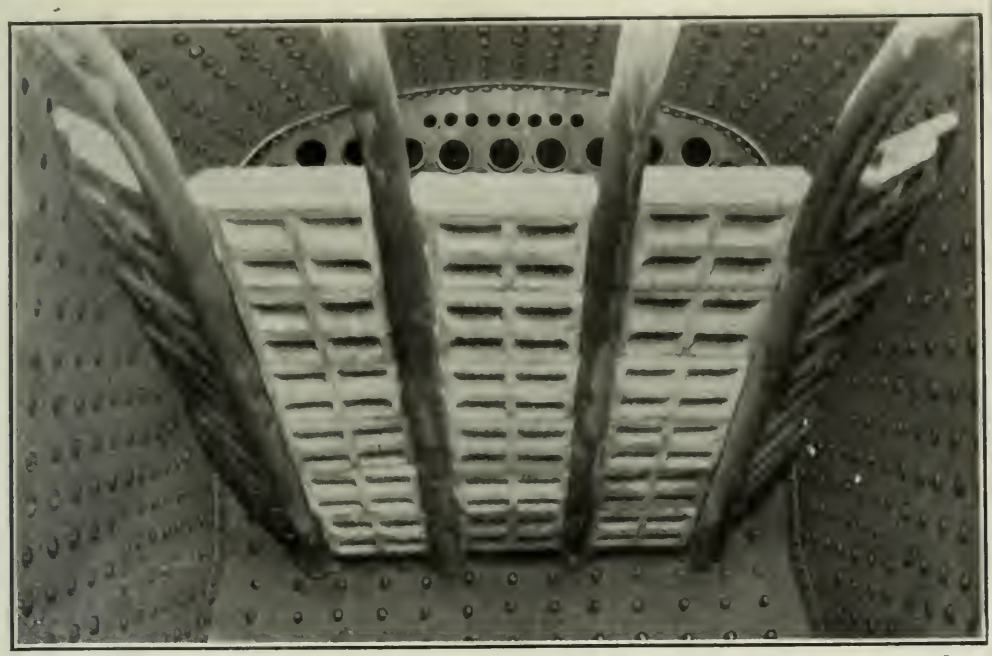
Mr. Chairman, I will be competent to take part in the discussion.

Chairman:

Moved by Mr. Cunningham, seconded by Mr. Holland that a hearty vote of thanks be extended to Mr. Naylor for his able paper. Carried. Applause.

Chairman:

The usual coffee and sandwiches have been provided in the room at the rear, gentlemen. I will declare the meeting adjourned and remind you of our annual meeting and smoker which will be held on May 11th.



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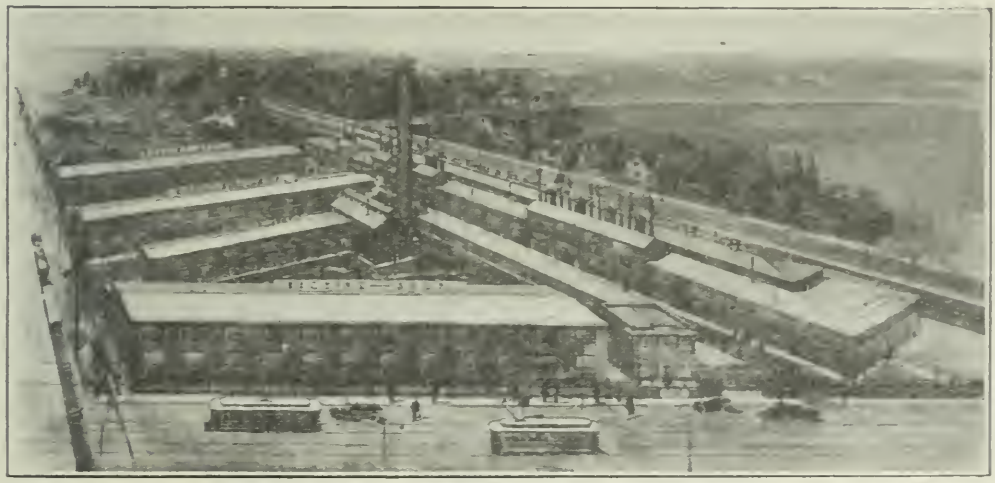

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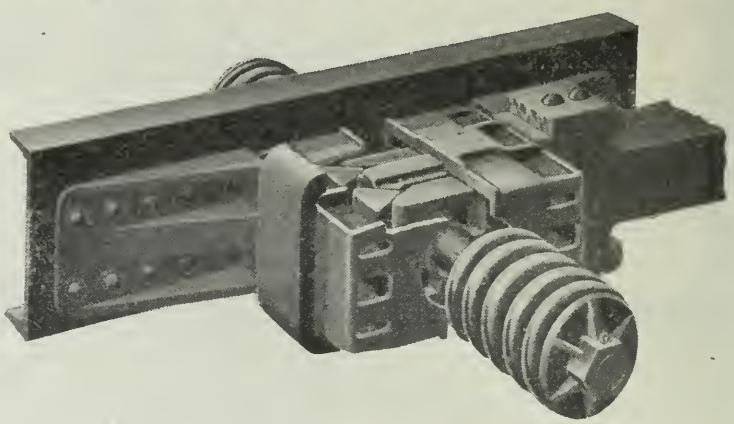

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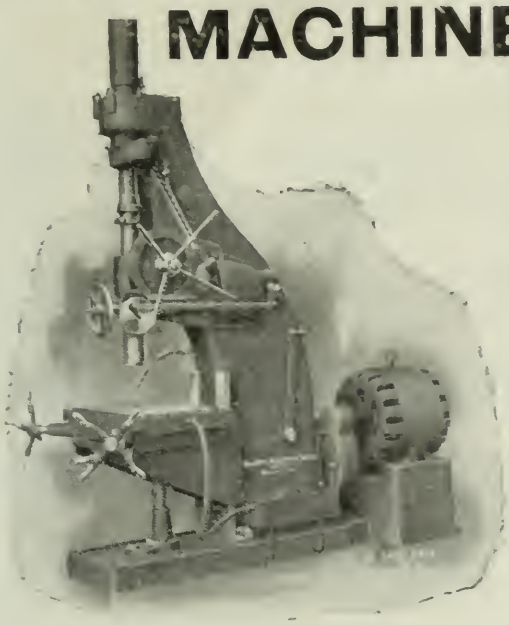

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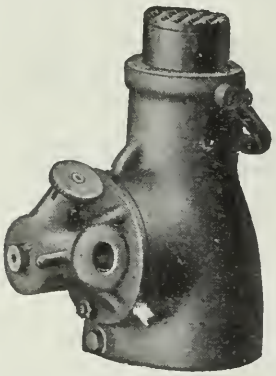

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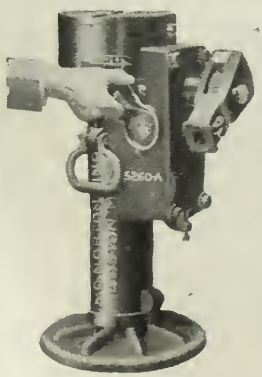

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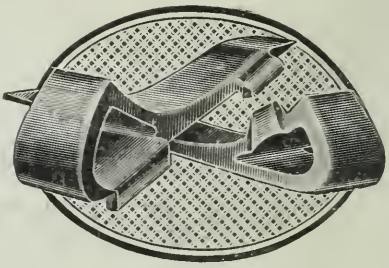

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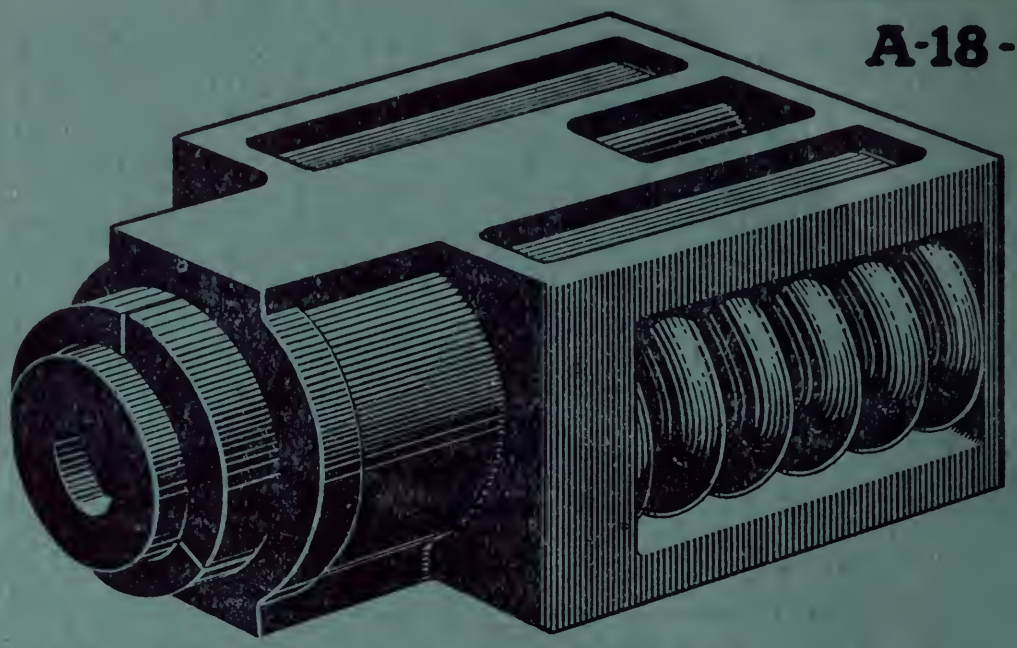

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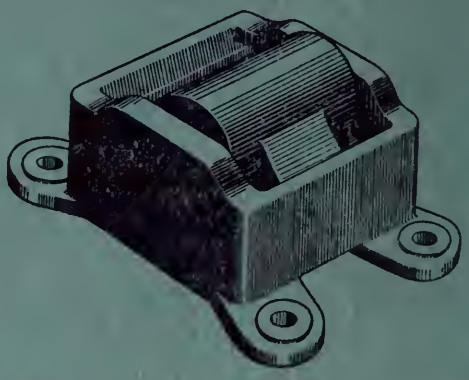

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